Claims

1. Cutting tool (100) for materials (70), in particular made

- of P[oly]U[rethane] elastomers,
- of P[oly]V[inyl]C[hloride],
- of T[hermo]P[lastic]E[lastomers],
- of T[hermo]P[lastic]E[lastomers] on Polyether-E[ster-base],
- of T[hermo]P[lastic]O[lefins] and/or
- of T[hermo]P[lastic Poly]U[rethanes]

as structural skin, as slush skin, as injection moulded skin and/or as casting skin, which cutting tool (100) is controlled in its motion, in particular program and/or robot controlled, comprising at least one cutting head (10)

- with at least one cutting blade (35),
- with at least one blade holder (30) for the cutting blade and
- with at least one driving device (20) setting the blade holder (30) with the cutting blade (35) into an oscillating or pulsating cutting movement or
- with at least one robot controlled device setting the blade holder (30) with the cutting blade (35) into a drawing forward movement producing the cut, in particular for airbag trims with weakening structures,

characterized in

- that, for the in-process control of the residual wall thickness (A2) of the indented materials (70) for the formation of weakening lines or of predetermined breaking and separating lines, i.e. for the airbag

weakening, at least one distance sensor (85) with a principle of measurement is provided on the cutting head (10) of the cutting tool (100) next to the cutting blade (35) thereof or next to the cutting tool (100) connected with the guiding and movement device thereof for measuring the distance to a cutting counterplate (81), the principle of measurement being chosen such that the sensor signal cannot be influenced in any way by a mould skin situated in the cutting seat, whereby the sensor signal serves as a measurable variable of a control circuit for which

- the distance (A) between the distance sensor (85) and the cutting counterplate (81) or
- the distance (A2) between the tip of the tool, i.e. the cutting blade (35) and the cutting counterplate (81) is the regulating variable and
- that the robot controlled device with its control circuit or at least one additional interconnected adjusting axle acts as an actuator.

2. Cutting tool according to claim 1,
characterized in
that the distance sensor (85) is configured as at least one cylindrical body which is connected with the cutting head (10) by at least one connection (40, 42) made of one or of several parts.

3. Cutting tool according to claim 1 or 2,
characterized in
that the distance sensor (85) is based on an inductive function principle.

4. Cutting tool according to claim 3,

characterized in
that the inductive sensor of the distance sensor (85) is adjusted in such a way that the distance of the inductive sensor to at least one electrically conductive object, in particular to the cutting counterplate, can be detected.

5. Cutting tool according to at least one of the claims 1 to 4, characterized in
that the control circuit
- is configured as position control circuit and/or
- is integrated into the cutting tool (100).

6. Cutting tool according to at least one of the claims 1 to 5, characterized in
that the connection of the control circuit with the cutting tool (100) is configured in such a manner that the measured variable, i.e. the signal of the distance sensor (85)
- is amplified and
- can be fed at at least one analog interface of the control in the control circuit.

7. Method for the in-process control of the residual wall thickness (A2) for the airbag weakening by means of a cutting tool (100) controlled in its motion, in particular program and/or robot controlled, for materials (70), in particular made

- of P[oly]U[rethane] elastomers,
- of P[oly]V[inyl]C[hloride],
- of T[hermo]P[lastic]E[lastomers], even on polyester or polyether-ester base,
- of T[hermo]P[lastic]O[lefins] and/or

- of T[hermo]P[lastic Poly]U[rethanes]
  as structural skin, as slush skin, as injection moulded skin and/or as casting skin, whereby the cutting tool (100) comprises at least one cutting head (10)
- with at least one cutting blade (35) and
- with at least one blade holder (30) for the cutting blade (35), whereby the blade holder (30) with the cutting blade (35)
- is set into an oscillating or pulsating cutting movement by means of at least one driving device (20) or
- by means of at least one robot controlled device into a drawing forward movement producing the cut,

characterized in

- that the cutting blade (35) for producing weakening structures along a predetermined breaking line in the material (70) of the airbag trim is moved with at least a predetermined forward speed along the predetermined breaking line and the material (70) is indented,
- that the distance (A) of the distance sensor (85) to a cutting counterplate (81) receiving the material to be indented (70) is measured by means of at least one distance sensor (85) placed besides the cutting tool (100) or besides the cutting blade (35) and guided together with the cutting tool (100) or together with the cutting blade (35) and
- that the residual wall thickness (A2) is calculated from the distance (A) measured between the distance sensor (85) and the cutting counterplate (81) minus the predetermined value kept constant during the cutting procedure for the distance (A1) of the distance sensor (85) to the base, i.e. to the bottom surface (86) of the

indent in the material (70), whereby the cutting blade (85) depth is automatically readjusted in case of deviations.

8. A method acording to claim 7,
characterized in
that, for the in-process control of the residual wall thickness (A2) of indented materials (70) for the formation of weakening lines or of predetermined breaking and separating lines for the airbag weakening, at least one distance sensor (85) with a principle of measurement is provided on the cutting head (10) of the cutting tool (100) next to the cutting blade (35) thereof or next to the cutting tool (100) connected with the guiding and movement device thereof for measuring the distance to the cutting counterplate (81), the principle of measurement being chosen such that the sensor signal cannot be influenced in any way by a mould skin situated in the cutting seat, whereby the sensor signal serves as a measurable variable of a control circuit for which
   - the distance (A) between the distance sensor (85) and the cutting counterplate (81) or
   - the distance (A2) between the tip of the tool, i.e. the cutting blade (35) and the cutting counterplate (81) is the regulating variable, whereby the robot controlled device with its control circuit or at least one additional interconnected adjusting axle acts as an actuator, whereby the residual wall thickness (A2) is calculated from the value of the distance (A) between the distance sensor (85) and the cutting counterplate (81) minus the height difference (A1) between the distance sensor (85) and the tip of the cutting blade (35).
9. Method according to claim 7 or 8,

characterized in
that the connection of the control circuit, in particular of the position control circuit, with the cutting tool (100) is configured in such a manner that the measured variable, i.e. the signal of the distance sensor (85) is
- amplified and
- fed to at least one analog interface of the control into the control circuit.

10. Use of at least one cutting tool (100) according to at least one of the claims 1 to 6 and/or of a method according to at least one of the claims 7 to 9 for the production of airbag trims with weakening structures, in particular for the formation of weakening lines or predetermined breaking and separating lines in materials (70) provided for the trim of airbags, for example made
- of P[oly]U[rethane] elastomers,
- of P[oly]V[inyl]C[hloride],
- of T[hermo]P[lastic]E[lastomers], even on polyester or polyether-ester base,
- of T[hermo]P[lastic]O[lefins] and/or
- of T[hermo]P[lastic Poly]U[rethanes]

as structural skin, as slush skin, as injection moulded skin and/or as casting skin.